

KATHRYN MCKAIN

NOAA Earth System Research Laboratory
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EDUCATION

Ph.D. Harvard University, Environmental Science and Engineering, 2015
M.A. Harvard University, Earth and Planetary Sciences, 2013
B.A. Mount Holyoke College, Biology and Chemistry, *summa cum laude*, 2005

RESEARCH AND PROFESSIONAL EXPERIENCE

Research Scientist, Cooperative Institute for Research in Environmental Sciences, University of Colorado, and NOAA Earth System Research Laboratory, Global Monitoring Division, Boulder, CO, 2015-present

- Conduct research on atmospheric greenhouse gas measurements and modeling, with particular emphasis on airborne observational platforms, in support of a long term national monitoring program and for multiple campaign-level projects

Graduate Research Assistant, Harvard University, Cambridge, MA, 2010-2015

- Used atmospheric measurements and a modeling framework to investigate urban greenhouse gas fluxes and trends and

Intern, Environmental Protection Agency, Climate Change Division, Washington DC, 2015

- Led weekly reading group of recent scientific publications on methane emissions from oil and gas to improve internal familiarity with methods and results, and attended all meetings related to greenhouse gas emissions quantification and potential regulations

Research and Development, Feed Resource Recovery, Boston, MA, 2008-2009

- Start-up company focused on anaerobic digestion of supermarket food waste where I conducted technology and industry research, and helped to design and operate a pilot-scale system

Research Assistant, Harvard Forest, Petersham, MA, 2005-2008

- Oversaw the ecological research activities at the Harvard Forest Environmental Monitoring Site, including the collection, analysis, and archiving of multiple long-term datasets on forest carbon cycling

GRANTS FUNDED

Airborne seasonal survey of CO₂ and CH₄ across the ABoVE domain, NASA Research

Opportunities in Space and Earth Sciences, PI: C Sweeney, Co-I: K McKain, 2017-2019

Measurements of CH₄ and CO₂ on the Atmospheric Tomography Mission, NASA Earth Venture

Suborbital sub-award, PI: K McKain, 2016-2020

NASA Earth and Space Science Graduate Fellowship, 2014 – 2015

FIELD CAMPAIGNS

- Atmospheric Tomography Mission (ATom), NASA DC8, 2016-2018
- Campaign to study methane emissions from the North Slope and Prudhoe Bay Oil Field, NOAA Twin Otter, Deadhorse, Alaska, 2016
- O₂/N₂ Ratio and CO₂ Airborne Southern Ocean (ORCAS) Study, NSF Gulfstream-V, Punta Arenas, Chile, 2016
- Study of Emissions and Atmospheric Composition, Clouds and Climate Coupling by Regional Surveys (SEAC⁴RS), NASA ER2, 2013

SERVICE

Peer-Reviewer: Geophysical Research Letters, Journal of Geophysical Research – Atmospheres, Atmospheric Chemistry and Physics, Atmospheric Environment, Urban Ecosystems, Carbon Management

Reviewer for Small Business Innovation Research (SBIR) proposals, 2016

Reviewer for NOAA Atmospheric Chemistry, Carbon Cycle and Climate (AC4) proposal, 2015

TEACHING

Head Teaching Fellow “The Fluid Earth”, an undergraduate introductory course on the atmosphere, oceans, and climate system, Harvard College, Spring 2012

Supervised multiple undergraduate thesis projects, 2005-2008, 2011

OUTREACH

To improve understanding and encourage discourse about our results on methane emissions in Boston, I made public presentations and participated in meetings at: National Grid (Nov 2013), Boston City Hall (Jan 2015), the Environmental Defense Fund (Jan, Feb 2015), a Department of Energy project workshop (Feb 2015), the Boston Bar Association (May 2015), New England Conference of Public Utility Commissioners (June 2015), a Harvard Law School seminar on oil and gas law (Nov 2015), and submitted testimony to the Massachusetts State Legislature (Nov 2015)

PUBLICATIONS

Sweeney C, Dlugokencky E, Miller CE, Wofsy S, Karion A, Dinardo S, Chang RYW, Miller JB, Bruhwiler L, Crotwell AM, Newberger T, **McKain K**, Stone RS, Wolter SE, Lang PE, Tans P, 2016, No significant increase in long-term CH₄ emissions on North Slope of Alaska despite significant increase in air temperature, Geophysical Research Letters, 43 (12): 6604-6611, doi: 0.1002/2016GL069292.

McKain K, 2015, Atmospheric observations and models of greenhouse gas emissions in urban environments, Ph.D. Dissertation, Harvard University.

McKain K, Down A, Raciti SM, Budney J, Hutya LR, Floerchinger C, Herndon SC, Nehr Korn T, Zahniser M, Jackson RB, Phillips N, Wofsy SC, 2015, Methane emissions from natural gas infrastructure and use in the urban region of Boston, Massachusetts. Proceedings of the National Academy of Sciences, 112 (7): 1941-1946, doi: 10.1073/pnas.1416261112, www.pnas.org/content/112/7/1941.

Nehr Korn T, Henderson M, Leidner M, Mountain M, Eluszkiewicz J, **McKain K**, Wofsy S, 2013, WRF simulations of the urban circulation in the Salt Lake City area for CO₂

modeling, *Journal of Applied Meteorology and Climatology*, 52: 323-340,
<http://journals.ametsoc.org/doi/abs/10.1175/JAMC-D-12-061.1>.

McKain K, Wofsy SC, Nehrkorn T, Eluskiewicz J, Ehleringer J, Stephens B, 2012, Assessment of ground-based atmospheric observations for verification of greenhouse gas emissions from an urban region, *Proceedings of the National Academy of Sciences* 109 (22): 8423-8428, doi: 10.1073/pnas.1116645109, www.pnas.org/content/109/22/8423.

Urbanski S, Barford C, Wofsy S, Kucharik C, Pyle E, Budney J, **McKain K**, Fitzjarrald D, Czikowsky M, Munger JW, 2007, Factors controlling CO₂ exchange on timescales from hourly to decadal at Harvard Forest, *Journal of Geophysical Research – Biogeosciences* 112: G0202, doi: 10.1029/2006JG000293, <http://onlinelibrary.wiley.com/doi/10.1029/2006JG000293/abstract>.

McKain K, 2005, Methods for measuring carbon accumulation in tree biomass in Northeastern forests, Undergraduate Thesis, Mount Holyoke College.

SELECTED PRESENTATIONS

An Atmospheric Measurement Network and Modeling Framework to Quantify Methane Emissions from Natural Gas Losses in the Boston Urban Region, MIT, Department of Civil and Environmental Engineering, Environmental Sciences Seminar Series, April 2015

An Atmosphere-based Method for Detection and Quantification of Methane Emissions from Natural Gas Infrastructure in an Urban Environment, invited oral presentation, AGU Fall Meeting, Dec 2015

Characterization of urban methane emissions in Boston, Massachusetts using an observational network and inverse modeling framework, Oral presentation, AGU Fall Meeting, Dec 2012